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– REPORT –
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Author: A. GRAHAM
QC Performed By: D. Wilder
Employee #: 301

		Date Sent	Initial	Date Rcvd	Initial
RESEARCH	1. Author's MSWord Draft to QC	3/26	A	3/26	DW
	2. QC'd Draft to Author	4/5	DW	4/5	A
	3. Revised Draft to QC (If Required)				
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GRAPHICS/PRODUCTION	5. Final MSWord Draft to Graphics ☑ Printed Written Draft ☑ MSWord Disk ☑ Exhibits ☑ Abstract ☐ Transmittal Letter ☐ Thank-You Package Transmittal Letter ☐ Interview Respondent Name/Address List ☐ Press Release Draft ☐ INPUT/OUTPUT Article Draft ☐ Questionnaire Blank ☐ Brochure (to sell report) ☐ Reverse Side of Form Completed	4/10	[illegible]	4/11	AJ
	6. First MAC MSWord Draft to Proofreader	4/12	AJ	13 April	A
	7. First MAC MSWord Draft to Author	4/17	AJ	4/17	A
	8. First MAC MSWord Draft back to Graphics	4/17	A	4/17	AJ
	9. Second Draft to Proofreader				
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January 1990
SOP Vol. I, No. 1

A Publication from INPUT's Systems Operations Program

Network Operations Management

Network size and complexity has grown dramatically over the past twenty years. Users that were concerned about the availability and quality of basic voice services years ago are now concerned with how to improve the flow of intra- and inter-organizational information over increasingly complex networks.

Organizations that previously had concerns about managing their voice systems now accept voice services as a basic commodity. And with the emergence of workstations and PCs, local-area, wide-area, and metropolitan-area networks have begun to receive increased attention, particularly as users continue to seek alternatives to high-cost carrier services.

With the growth of disparate, specialized, local and long-distance networks, the increasing recognition of networks as a strategic asset, and the growth of systems integration, organizations increasingly recognize that networks must be integrated in order to meet the needs of the future.

As more organizations seek to integrate their networks, concerns have begun to arise about the ability of ~~the existing~~ information systems and telecommunications staffs to effectively manage the integrated network environment.

Research indicates that the network management process of the future will need to be more end-user oriented. To respond to end-user needs, there will be a need to reduce time spent on the details of problem management and increase attention ~~to~~ on strategic asset management.

To address the problems of managing integrated networks, organizations are beginning to look for alternatives that will be more cost-effective and permit more focus on strategic telecommunications planning.

Significant Organizational Issues

There are numerous issues associated with managing networks in today's organizations. A few of the more critical ones are cited below:

- In many organizations, there is a lack of skilled personnel to manage large integrated networks. The skills and processes of managing a voice system are not necessarily transferrable to the management of a LAN or long-line data network. Integration may necessitate additional staff, further increasing costs.
- The use of network management tools is increasing significantly, but many tools are complex and do not address multivendor problems.

- Many network management tools are underutilized. Users indicate that the tools are complex, their staff is under-trained, and that many of today's tools will not work affectively in an integrated network environment.
- Compounding the problems, though many telecommunications managers believe that they are doing a good job, information systems and corporate management do not necessarily agree. They have increasing interest in individuals who are more strategically and less technically focused.
- Changes in the industry also contribute to the concerns of many organizations. Seemingly, deregulation has led to continually increasing complexity and costs, making decisions difficult. Organizations are in need of a simplified environment, not an environment that requires increased amounts of corporate resources to manage.

These and other issues are causing organizations to begin to consider alternatives to the traditional in-house approach to network management.

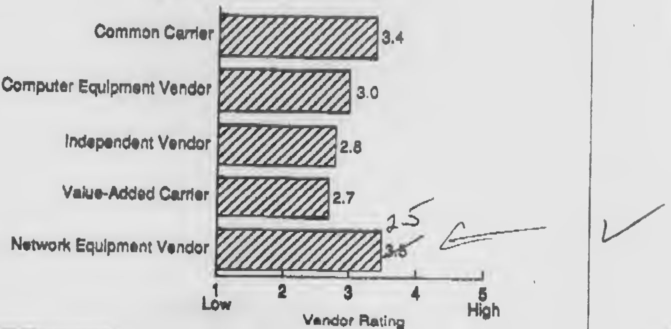
Network Management Outsourcing Considerations

There are numerous considerations related to outsourcing. They reflect user concerns and indicate a trend toward greater consideration of outsourcing as a viable alternative. There are a number of key points.

- An estimated 68% of all respondents indicate that they manage their networks with in-house staff.
- However, when considering private and public sector organizations separately, research data indicates that private sector users are six times more likely to manage their networks with in-house staff today, and that public sector organizations are nine times as likely to contract for management of their networks.

Exhibit 1

Few Categories of Vendors Are Able to Meet User Needs



From the research results, it is apparent that not many of organizations have considered contracting for services. Only 30% of those that are not currently contracting have even considered contracting as an alternative, but 65% of those respondents think that it is a growing trend.

Review of the comments accompanying these responses indicate that users have not given contracting serious consideration primarily because they do not see significant financial benefit and they generally do not ~~consider~~ BELIEVE THAT vendors have the capability to manage large, complex, integrated networks.

When asked to rate the ability of several categories of vendors to manage large, integrated networks, none were rated very high, as shown in Exhibit 1. Even the ratings provided need to be qualified.

Review of the data indicates that there are currently no real leaders in providing network management services. While common carriers and computer equipment vendors led the list, their ratings were not much above average.

In a related question, users were frequently unable to identify a leading vendor or they identified vendors based on name recognition. Exhibit 2 shows vendors most frequently mentioned by users and other vendors.

When considering the organizations that have contracted for network management services, there is some indication that providers of systems operations services may be in a strong position to manage user networks. Of the organizations that have contracted for network and systems operations management, 92% indicated that the provider is the same.

This data must be viewed with some caution, since the majority of those contracting were from the public sector, where contracting is looked upon more favorably. However, the data does suggest a correlation between contracting for systems operations and contracting for network management.

Exhibit 2

Leading Network Management Vendors Most Frequently Mentioned

Vendor	Number of Mentions	
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BT/Tymnet	2	-
EDS	2	4
Sprint	2	1

Exhibit 3

Strong Vendor Qualifications Necessary

- Technical expertise
- Demonstrated experience
- Single source
- Service orientation
- Network management tools

As indicated in Exhibit 3, there are a number of qualifications that users consider important for a vendor to be considered a candidate for network management services.

- Vendors must have a high degree of technical expertise in all three major types of networks—voice, local-area, and long-line data circuits. Users believe that expertise in one area is not readily transferrable to the other areas.
- Vendors must be able to demonstrate experience. There is sufficient concern over a vendor's ability to manage three different types of networks that users expect vendors to be able to demonstrate experience and capability before the vendor will be considered as a potential candidate.
- Users want to be able to obtain their network management services from a single vendor. Thus vendors must be able to provide broad technical and managerial capability.
- Users want to deal with a vendor that has a proactive service orientation. Vendors that keep users advised of existing and potential problems, and advise them of the status of problems being addressed, will be considered more favorably than those that don't.
- Users expect vendors to have the necessary tools to manage an integrated network. In a highly complex network, the ability to utilize management tools effectively is a necessity.

Growing Expenditures

Contracting for network management is not a new concept, but as a definable market, it is just beginning to grow.

Numerous organizations contract with a third party, in one form or another, for management of all or part of their networks. Although Centrex service ~~can~~ MIGHT ✓ be considered a form of network management, INPUT generally defines network operations management as contracting with a single ~~organization~~ VENDOR for the management of all of an organization's network services.

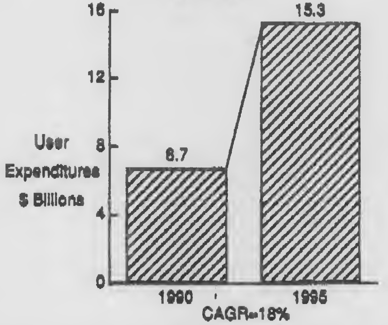
To develop the market forecast, INPUT took a number of factors into account. These included the number of organizations that have large, mission-critical networks, the number of organizations that contract for services today, the number of organizations that have investigated contracting, and whether network management is considered to be a trend.

Based on INPUT's research of the current market and factors that could affect its growth, INPUT estimates that the market for network management is approximately $6.7 billion in 1990. The market is projected to grow at an estimated 18% per year to $15.3 billion by 1995.

Need a reference to Exhibit ???

Exhibit 4

Network Management Expenditure Forecast 1990-1995



Driving Forces

There are a number of forces driving growth of the network management market . These can be summarized into three categories, as shown in Exhibit 5.

Exhibit 5

Driving Forces for Network Operations Management

- Financial savings
- Network complexity
- Availability of expertise

- The costs of managing networks has grown steadily over the past few years and, though there are continuous efforts to hold or reduce costs, organizations recognize that management of large integrated networks is becoming increasingly costly.
- Because of the growing costs and recognition of the importance of networks to the business, users are beginning to consider alternatives to either achieve savings or hold costs down.
- Another factor is the increasing complexity of networks. Users recognize that networks must be integrated and that complexity increases with the integration. They also recognize that sophisticated management techniques are necessary to successfully manage complex networks.
- While many organizations have developed expertise and processes to manage integrated voice and data networks, introduction of LANs into the environment increases the complexity significantly. Until recently, LANs were not a major consideration in network management. They are becoming an increasingly important factor. Many organizations do not have the breadth of expertise to successfully manage fully integrated telecommunications services.
- Closely related to the increasing complexity is availability of staff expertise to manage the environment. Skills developed to manage a voice or long line data network may not be directly transferrable to management of an integrated (voice, data, LAN)

environment. Users are interested in alternatives to the continual requirements ~~for~~ to increase staff ~~increases~~.

Key Conclusions and Recommendations

There are a number of conclusions and recommendations resulting from INPUT's research into the market for network operations management. Major points include the following:

- The market for network management services is just beginning to emerge and growth is being dampened by significant user resistance.

- Because of the resistance, network managers will watch the development of systems operations contracting carefully. Success in systems operations contracting will stimulate contracting for network management. Many users consider that contracting for network management has a higher degree of risk.

- To be successful in the network management market, many vendors will need to broaden their base of skills. Users indicate that comprehensive technical skills in voice systems, long-line data networking and local-area networking are necessary to be considered a leading provider.

- A key element to success will be the extent to which a vendor provides proactive support. Proactive support implies advising users before problems happen and continually advising them of progress toward resolution. Proactive support can allay fears of loss of control by conveying the sense that users are part of the management process.

There are a number of areas that vendors need to address to be successful, but in a young and growing market, there is time to prepare strategies that will result in market penetration.

This Research Bulletin is issued as part of INPUT's Systems ~~Integration~~ Operations Program.
The information for this Bulletin was extracted from a soon-to-be-released report,
U.S. Network Management Market, 1990-1995.

If you have questions or comments on this bulletin or wish to purchase the report, please
contact your local INPUT organization or Doug Wilder at
INPUT Inc., 1953 Gallows Rd., Suite 560, Vienna, VA, 22182.
Phone: 703-847-6870, Fax: 703-847-6872.

Research Bulletin

Network Operations Management

Network size and complexity has grown dramatically over the past twenty years. Users that were concerned about the availability and quality of basic voice services years ago are now concerned with how to improve the flow of intra- and inter-organization information over increasingly complex networks.

Organizations that previously had concerns about managing their voice systems now accept voice services as a basic commodity. And with the emergence of workstations and PCs; local, wide area, and metropolitan area networks have begun to receive increased attention, particularly as users continue to seek alternatives to high cost carrier services.

With the growth of disparate, specialized, local and long distance networks, the increasing recognition of networks as a strategic asset, and the growth of systems integration, organizations increasingly recognize that networks must be integrated to be able to meet the needs of the future.

With more organizations looking to integrate their networks, concerns have begun to arise about the ability of the existing information systems and telecommunications staff to effectively manage the integrated network environment.

Research indicates that the network management process of the future will need to be more oriented to the needs of end users. To respond to end user needs, there will be a need to reduce the time spent on the details of problem management and increase attention placed on strategic asset management.

To address the problems of managing integrated networks, organizations are beginning to look for alternatives that will be more cost effective and permit more focus on strategic telecommunications planning.

Organization Issues Are Significant

There are numerous issues associated with managing networks in today's organizations. A few of the more critical ones are cited below.

- In many organizations, there is a lack of skilled personnel to manage large integrated networks. The skills and processes to manage a voice system are not necessarily transferrable to the management of a LAN or long line data network. Integration may necessitate additional staff, further increasing costs.

- The use of network management tools is increasing significantly, but many tools are complex and do not address multivendor problems.

- Many network management tools are underutilized. Users indicate that the tools are complex, their staff is under-trained, and that many of today's tools will not work effectively in an integrated network environment.

* Compounding the problems, while many telecommunications managers believe that they are doing a good job, information systems and corporate management do not necessarily agree. They have increasing interest in individuals that are more strategically and less technically focused.

* Changes in the industry also contribute to the concerns of many organizations. Seemingly, deregulation has led to continually increasing complexity and costs, making decisions difficult. Organizations are in need of a simplified environment, not an environment that requires increased amounts of corporate resources to manage.

These and other issues are causing organizations to begin to consider alternatives to the traditional in-house approach to managing networks.

Network Management Outsourcing Considerations

There are numerous considerations related to outsourcing. They reflect user concerns and indicate a trend toward greater consideration of outsourcing as a viable alternative. There are a number of key points.

* An estimated 68% of all respondents indicate that they manage their networks with in-house staff.

* However, when considering private and public sector organizations separately, research data indicates that private sector users are six times a likely to manage their networks with in-house staff today and that public sector organizations are nine times as likely to contract for management of their networks.

From the research results, it is apparent that the number of organizations that have considered contracting for services is not high. Only 30% of those that are not currently contracting have even considered contracting as an alternative, but 65% of those respondents think that it is a growing trend.

Review of the comments accompanying these responses indicate that users have not given contracting serious consideration primarily because they do not see significant financial benefit and they generally do not consider vendors to have the capability to manage large, complex, integrated networks.

When asked to rate the ability of several categories of vendors to manage large, integrated networks, none were rated very high, as shown in Exhibit II-3. Even the ratings provided need to be qualified.

Exhibit 1 Here

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Exhibit 2 Here

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As indicated in Exhibit 3, there are a number of qualifications that users consider important for a vendor to be considered a candidate for network management services.

Exhibit 3 Here

* Vendors must have a high degree of technical expertise and the expertise must be in all three major types of networks - voice, local area, and long line data circuits. Users believe that expertise in one area is not readily transferrable to one of the other areas.

* Vendors must be able to demonstrate experience. There is sufficient concern over a vendors ability to manage three different types of networks, that users expect vendors to be able to demonstrate experience and capability, before the vendor will be considered as a potential candidate.

* Users want to be able to obtain their network management services from a single vendor. This further indicates that vendors must be able to provide broad technical and managerial capability.

* Users want to deal with a vendor that has a pro-active service orientation. Vendors that keep a user advised of existing and potential problems and advise them of the status of problems being addressed will be considered more favorably than those that don't.

* Users expect vendors to have the tools necessary to manage an integrated network. In a highly complex network, the ability to utilize management tools effectively is a necessity.

Expenditures are Growing

Contracting for network management is not a new concept, but as a definable market, it is just beginning to grow.

There are numerous organizations that contract with a third party, in one form or another, for management of all or part of their networks. While Centrex service can be considered a form of network management, INPUT generally defines network operations management as - contracting with a single organization for the management of all of an organizations network services.

To develop the market forecast, INPUT took a number of factors into account. These included the number of organizations that have large, mission critical networks, the number of organizations that contract for services today, the number of organizations that have investigated contracting, and whether network management is considered to be a trend.

Based on INPUT's research of the market today and factors that could effect growth of the market, INPUT estimates that the market for network management is approximately $6.7 billion in 1990. The market is projected to grow at an estimated 18% per year to $15.3 billion by 1995.

Exhibit 4 Here

Driving Forces

There are a number of forces driving growth of the market for network management. These can be summarized into three categories, as shown in Exhibit 5.

Exhibit 5 Here

- The costs of managing networks has grown steadily over the past few years and, while there are continuous efforts to hold or reduce costs, organizations recognize that management of large integrated networks is growing increasingly costly.

- Because of the growing costs and recognition of the importance of networks to the business, users are beginning to consider alternatives to either achieve savings or hold costs down.

- Another factor is the increasing complexity of networks. Users recognize that networks must be integrated and that complexity increases with the integration. They also recognize that sophisticated management techniques are necessary to successfully manage complex networks.

- While many organizations have developed expertise and processes to manage integrated voice and data networks, introduction of LANs into the environment increases the complexity significantly. Until recently, LANs were not a major consideration in network management. They are becoming an increasingly important factor. Many organizations do not have the breadth of expertise to successfully manage fully integrated telecommunications services.

- Closely related to the increasing complexity is availability of staff expertise to manage the environment. Skills developed to manage a voice or long line data network may not be directly transferrable to management of an integrated (voice, data, LAN) environment. Users are interested in alternatives to the continual requirements for increases in staff.

Key Conclusions and Recommendations

There are a number of conclusions and recommendations resulting from INPUT's research into the market for network operations management. Major points include the following:

- The market for network management services is just beginning to emerge and growth is being dampened by significant user resistance.

- Because of the resistance, network managers will watch the development of systems operations contracting carefully. Success in systems operations contracting will stimulate contracting for network management. Many users consider that contracting for network management has a higher degree of risk.

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Exhibit 1

~~II-3~~ Same as

Exhibit ~~IV~~ = 10

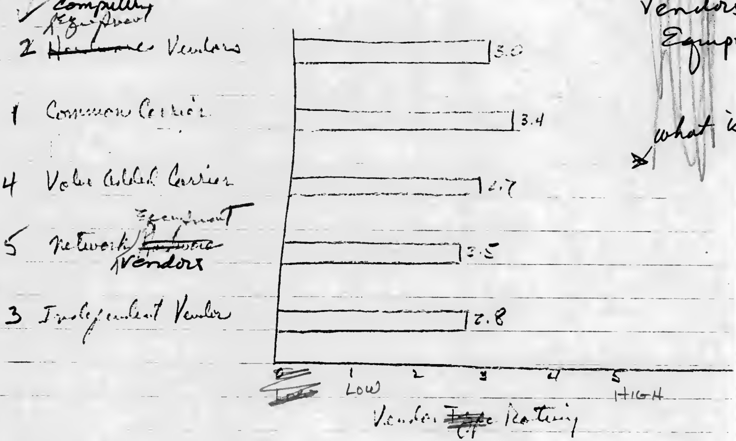
Categories ~~Types~~ of CF

How Vendors are able to meet user needs

Put in order 3-4-3

What is between Vendors Equipm

what is



Scale from 1-5, not 0-5

Exhibit 2

~~Exhibit~~ ~~IV~~ II - 1

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Let
into
S

Exhibit 3

~~II-5 [illegible]~~

~~Exhibit V-7~~

Strong Vendor Qualifications Necessary

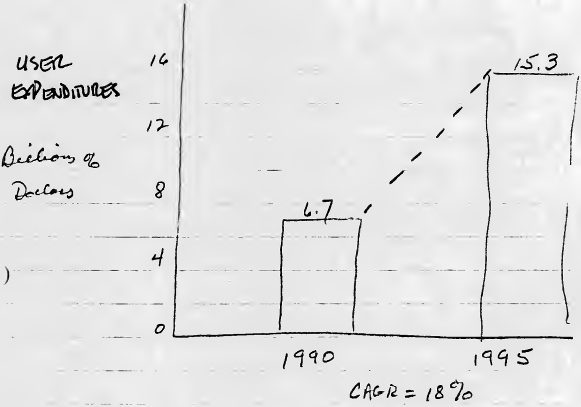
Technical Expertise
Demonstrated Experience
Single Source
Service Orientation
Network Management Tools

Exhibit 4

II-6 Same as

Exhibit ~~III-2~~

Network Management Expenditure Forecast, 1990-1995



Lets discuss forecasting methodology

Exhibit 5

II — 8

Exhibit ~~IV~~ 8

Driving Forces for Network
Operations Management

Financial Savings

Network Complexity

Availability of Expertise

April 1990
SOP Vol. I, No. 1

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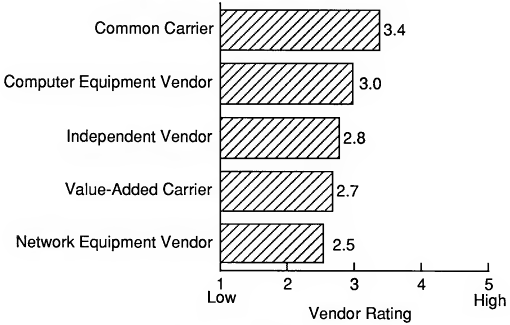

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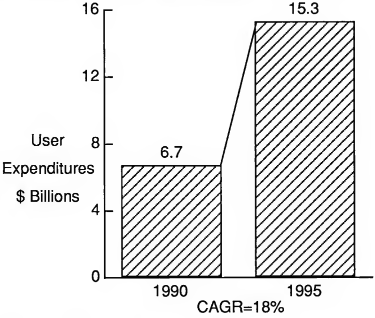
Exhibit 4

Network Management Expenditure Forecast 1990-1995



Driving Forces

There are a number of forces driving growth of the network management market . These can be summarized into three categories, as shown in Exhibit 5.

Exhibit 5

Driving Forces for Network Operations Management

- Financial savings
- Network complexity
- Availability of expertise

- The costs of managing networks have grown steadily over the past few years and, though there are continuous efforts to hold or reduce costs, organizations recognize that management of large integrated networks is becoming increasingly costly.
- Because of the growing costs and recognition of the importance of networks to the business, users are beginning to consider alternatives to either achieve savings or hold costs down.
- Another factor is the increasing complexity of networks. Users recognize that networks must be integrated and that complexity increases with the integration. They also recognize that sophisticated management techniques are necessary to successfully manage complex networks.
- While many organizations have developed expertise and processes to manage integrated voice and data networks, introduction of LANs into the environment increases the complexity significantly. Until recently, LANs were not a major consideration in network management. They are becoming an increasingly important factor. Many organizations do not have the breadth of expertise to successfully manage fully integrated telecommunications services.
- Closely related to the increasing complexity is availability of staff expertise to manage the environment. Skills developed to manage a voice or long-line data network may not be directly transferrable to management of an integrated (voice, data, LAN)

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environment. Users are interested in alternatives to the continual requirements to increase staff.

Key Conclusions and Recommendations

There are a number of conclusions and recommendations resulting from INPUT's research into the market for network operations management. Major points include the following:

- The market for network management services is just beginning to emerge and growth is being dampened by significant user resistance.
- Because of the resistance, network managers will watch the development of systems operations contracting carefully. Success in systems operations contracting will stimulate contracting for network management. Many users consider that contracting for network management has a higher degree of risk.
- To be successful in the network management market, many vendors will need to broaden their base of skills. Users indicate that comprehensive technical skills in voice systems, long-line data networking and local-area networking are necessary to be considered a leading provider.
- A key element to success will be the extent to which a vendor provides proactive support. Proactive support implies advising users before problems happen and continually advising them of progress toward resolution. Proactive support can allay fears of loss of control by conveying the sense that users are part of the management process.

There are a number of areas that vendors need to address to be successful, but in a young and growing market, there is time to prepare strategies that will result in market penetration.

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If you have questions or comments on this bulletin or wish to purchase the report, please
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